

no reason to suppose that the development of the entomophilous flora would have varied in any respect had entomophily never arisen among the Coleoptera.

TABLE OF NORTH AMERICAN SPECIES OF THE DIP-
TEROUS GENUS THRYPTICUS, WITH DESCRIP-
TIONS OF FOUR NEW SPECIES.

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While studying the Thrypticus in my collection and a little material that came to hand I found four forms that seem to be new. These are described below.

In *willistoni* Wh. the fore and middle coxæ may be mostly yellow or infuscated almost to the tips, while in the female they may be somewhat blackened. This seems to be our most abundant species in western New York. I have seen examples from New England; Toronto, Ont.; and Columbia, Mo. I have taken a number of *T. fraterculus* Wh. at Lewiston, N. Y., and have seen a series of eight from Berkeley Hills, Cal.; Professor Aldrich reports it from Mexico.

The species of Thrypticus are minute flies of bright metallic color with a concave area in front of the scutellum and with the bristles and hairs of the thorax and abdomen yellow; the third and fourth longitudinal veins are usually convergent at tip, but sometimes parallel, and the hypopygium is flexed under the abdomen, often reaching nearly to the thorax.

The hypopygia of the males of those species I have examined are very similar. There is a large capsule or outer part which is covered with scales of pollen that are always inclined backward. Its appendages are lamelliform with a pair of slender processes at their base in most species (these seem to be lacking in *willistoni*). There is also a central filament (the penis) which originates on or near the base of the hypopygium and usually extends nearly to the end of the lamellæ; this filament is inclosed in a sheath which is shorter and often so closely applied to it that the two appear to form one piece. In the drawing of *aurinotatus* sp. nov. this filament does not show as it was folded under the abdomen.

Most of the species of this genus are difficult to separate except by the hypopygium and its appendages, and great care should be taken to place the specimen so as to get a direct side view of these organs, or the perspective will give a very wrong idea of their form.

In mounting them it is always best to extend the hypopygium, which can be done easily with a pin.

Some allowance must be made for shrinkage and also for variation in color, but I do not think the variation is great. This paper is based on the study of about fifty specimens.

TABLE OF NORTH AMERICAN SPECIES.

1. Femora green (Fig. 2)	<i>fraterculus</i> Wh.
Femora yellow	2
2. Venter and part of the dorsum of the abdomen yellow	3
Abdomen without yellow except sometimes on the venter	4
3. Venter, whole of sixth abdominal segment, antennæ and base of hypopygium yellow (Fig. 8)	<i>cupuliferus</i> Ald.
Venter, first two abdominal segments, antennæ and base of hypopygium yellow (Fig. 1)	<i>abdominalis</i> Say.
4. Hypopygium ovipositor-like, bent under the abdomen	<i>singularis</i> Ald.
Hypopygium normal	5
5. Fourth vein bent backward to meet the cross-vein, forming a distinct angle at this point	<i>minor</i> Ald.
Fourth vein only gently bent at the cross-vein	6
6. Antennæ yellow	7
Antennæ black	8
7. Capsule of hypopygium truncate at tip (Fig. 3)	<i>vietus</i> n. sp.
Capsule pointed at tip (Fig. 5)	<i>muhlenbergiæ</i> J. & C.
8. Hypopygial lamella sessile, rounded at tip (Fig. 9)	<i>tectus</i> sp. nov.
Lamella somewhat petiolate	9
9. Lamella nearly round (Fig. 6)	<i>willistoni</i> Wh.
Lamella large, somewhat oval, about twice as long as wide	10
10. Thorax green with violet reflections and a golden spot before the scutellum (Fig. 4)	<i>aurinotatus</i> sp. nov.
Thorax green or purple with the posterior depression green	11
11. Thoracic dorsum purple, hypopygium rather pointed, lamella pointed	<i>pusillus</i> Ald.
Dorsum of thorax green, hypopygium rounded at tip (Fig. 7) ..	<i>comosus</i> sp. nov.

Thrypticus abdominalis Say.

Chrysotus abdominalis Say., Jour. Acad. Sci. Philadelphia, VI, p. 169.

Male: Length 2 mm. Eyes nearly touching below the antennæ; face green (purple in one specimen); front purple; mouth parts yellow or yellowish brown; antennæ and arista yellowish brown; bristles of the head and thorax yellowish. Thorax

green, sometimes with coppery reflections on the posterior part, in one specimen with purple reflections on the anterior part; pleuræ green with the posterior edge yellow. Abdomen bright green with the first two segments almost entirely yellow; venter yellow; hypopygium (Fig. 1) brown with the base yellowish; its appendages yellow, the lamella with mixed yellow and black hairs. Coxæ and feet pale yellow with yellow hairs. Tegulæ, their cilia and the halters yellow. Wings hyaline, slightly tinged with gray; veins yellowish.

Redescribed from four males: one in the Cornell University collection, taken about the first of June at Columbus, Mo., by C. R. Crosby; one in the collection of C. W. Johnson and taken at Hot Springs, N. C., and two from Opelousas, La., in April.

In the drawing the central filament is separated from its sheath and bent upwards, usually it is carried in its sheath and they appear to form one piece.

Thrypticus vietus sp. nov.

Male: Length 2 mm. Eyes contiguous (or seem to be, the head is shrunken); front green; palpi yellow; antennæ yellow, darker at tip; bristles of the head and the arista yellowish, but brown in certain lights. Thorax bright but dark green; abdomen dark metallic green with slight violet reflections toward the base; hairs and bristles of the thorax and abdomen yellow; hypopygium (Fig. 3) brown with yellow appendages; lamella oval, rather large; filament black with yellow tip which is a little spear-shaped. Fore coxæ yellow; middle and hind coxæ black with yellow tips; femora, tibiæ and tarsi pale yellow, their hairs mostly yellowish. Tegulæ, their cilia and the halters yellow. Wings grayish hyaline; veins brown; third and fourth veins parallel.

Female: Ovipositor minute, reddish yellow; tip of the abdomen and the base of the segments reddish coppery; face bluish green.

Described from one male and one female which I took at Bradentown, Fla., March. Type in the author's collection.

Thrypticus comosus sp. nov.

Male: Length 1.75 mm. Face dark green, shining, wide at the antennæ but the eyes almost meeting at the oral margin; mouth parts yellowish; Front dark green, ocellar bristles brownish yellow; antennæ dull black, small. Thorax and abdomen dark green, very shining, the former with slight golden reflections; bristles of the thorax and abdomen yellowish; hypopygium black, shining, its appendages yellow; (Fig. 7); lamella large with minute pubescence and several bristly hairs on the surface, behind the lamella there is a slender bristly appendage and back of this two long slender hairs, which are nearly as long as the hypopygium; filament dark yellow. Fore coxæ yellow; middle and hind coxæ black with greenish reflections and yellowish tips; femora, tibiæ and tarsi pale yellow; last joint of the middle and last two joints of the fore tarsi blackish. Tegulæ, their cilia and the halters yellowish. Wings hyaline; veins brown; venation as in *willistoni*.

Described from two males, one taken at Ellis, N. Y., on June 13; and one at Toronto, Ont., July 4. Type in the Cornell University collection.

This species differs from others in having two long slender hairs near the base of the hypopygial lamella, and in the form of the hypopygium. It comes near *aurinotatus* sp. nov. in the form of the hypopygium and its appendages.

Thrypticus tectus sp. nov.

Male: Length 2 mm. Face bright green, narrow; mouth parts black; front violet, shining; frontal bristles black; antennæ small black; arista dark brown, pubescent. Thorax and abdomen bright green with yellow hairs and bristles which appear dark brown when viewed from the side; hypopygium black, only a little shining, its appendages short and yellow, lamella rounded at tip (Fig. 9). Fore coxæ and legs pale yellow, tarsi scarcely infuscated at tips; middle and hind coxæ infuscated almost to the tips; fore coxæ slightly darkened on the front surface; hind coxæ with a slender bristle on the outer side. Halteres yellow. Wings with the venation typical of the genus; tinged with gray; veins brown.

Described from one male taken at East Aurora, Erie County, N. Y., July 12. Type in the author's collection.

This comes so near *willistoni* Wh. that it was with some hesitation that I separated it. It looks like that species with the lamellæ half concealed, but it also has the appendages at their base well developed, these appendages are not found in *willistoni*, the lamella is also more hairy.

Thrypticus aurinotatus sp. nov.

Male: Length 1.25 mm. Face narrow; front black (opaque in type specimen); antennæ and arista brown, densely covered with pale pubescence, the former with the third joint somewhat rounded at tip. Thorax dark green, appearing dark violet when viewed from the front; depressed portion before the scutellum very conspicuous, being deep, well defined and of a golden color when seen from behind. Abdomen dark green; all the hairs and bristles of the thorax and abdomen yellow; hypopygium (Fig. 4) black, appendages pale yellow, lamella large and rather pointed, the inner appendages are also larger than in most species and as long as the lamella. Tegulæ, their cilia and the halteres pale yellow. Coxæ and legs pale yellow with the hairs mostly yellow. Wings grayish hyaline, veins yellowish brown, becoming yellow at the root of the wing; venation about as in *T. willistoni* Wh.

Described from one male from Billy's Island, Okefenokee Swamp, Ga. Taken by Dr. J. C. Bradley in June. Type in the Cornell University collection.

This species is related to *willistoni* Wh. and *vietus* sp. nov. but differs much in general color, and in the form of the hypopygium and its appendages. It also differs from *vietus* in having the antennæ brown, not yellow as in that species.

SYSTEMATIC PAPERS ON NEW ENGLAND
HEMIPTERA.¹

BY H. M. PARSHLEY.

With Plates VI and VII.

I. SYNOPSIS OF THE FAMILIES.

The tables to be published under the above title form a part of a general account of the Hemiptera² of New England on which I am engaged, but as an early appearance of the whole is not to be expected, it seems desirable that the more generally useful parts be made immediately available.

There are to be found in various publications a number of keys to the families of Hemiptera, but for one reason or another they do not enable those who are unfamiliar with the group to place specimens with certainty in their proper families. Some are inaccurate, some incomplete, while those which are free from these faults are very difficult to work because they generally lack figures and employ obscure characters, the latter often necessary in a table which aims at universality or natural arrangement. It seems to me that these difficulties can be avoided by limiting the application of the key to the fauna of a restricted region,³ sacrificing natural arrangement in favor of clearness, and illustrating structures of importance. The synopses in this series are offered as an attempt in that direction.

In preparing the tables I have made free use of the writings of previous authors, but all the work has been done with continual reference to the specimens themselves, more particularly of the species occurring in New England, of which I have before me a fairly complete collection. Thus the characters proposed by others

¹ Contributions from the Entomological Laboratory of the Bussey Institution, Harvard University, No. 91.

² Considered as an order distinct from the Homoptera.

³ Thus permitting in some cases the use of easily observable characters not common to all members of the family in question.